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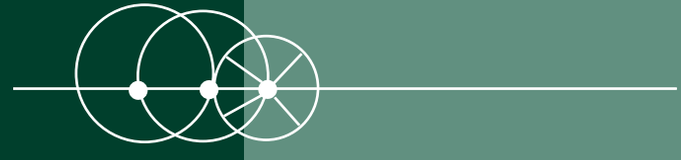
Pollution Prevention Driving Change



Jennifer M. Granholm, Governor ◆ Steven E. Chester, Director

2002 Pollution Prevention Annual Report for the
Environmental Science and Services Division of the Michigan Department of Environmental Quality

DEQ

Introduction

The Michigan Department of Environmental Quality has the responsibility of encouraging pollution prevention practices under Parts 143 and 145 of Public Act 451, the Natural Resources and Environmental Protection Act (NREPA). The legislation requires that the Department publish and submit an annual report to the legislature and governor detailing the efforts undertaken during the previous fiscal year.

This report summarizes the Department's major pollution prevention activities in fiscal year 2002, a time period covering October 1, 2001 through September 30, 2002. This report reviews the state's progress in pollution prevention and summarizes program accomplishments. It also provides an opportunity to acknowledge the Department's pollution prevention partners and to illustrate the types of pollution prevention improvements being undertaken by Michigan facilities.

The Environmental Science and Services Division welcomes comments on the report and encourages feedback on the performance of its programs. A customer survey is available at www.deq.state.mi.us/eforms/p2rptsurvey.html.

www.deq.state.mi.us/documents/deq-ead-p2-2002p2rept.pdf

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Empowering Pollution Prevention at Facilities and in Communities

A Message from Pollution Prevention Staff:

Welcome to the 2002 Annual Pollution Prevention Report. The word to describe the world of pollution prevention in Michigan over the past year is: FORWARD! There are many ways to measure the success of pollution prevention efforts. This report provides a snapshot view of the year's best efforts and most accomplished programs in the pollution prevention arena. Reducing waste and taking every opportunity to identify ways that we can keep waste from occurring in the first place is a shared responsibility.

The Department of Environmental Quality manages over 20 different outreach and assistance programs to meet our legislative mandate of facilitating pollution prevention. The success or failure of any program can be measured by the dedication and creativity of its participants. The success stories we have to tell are the direct result of the vital partnerships the Department established with businesses, industry, universities, non-profit associations, community leaders, and citizens.

This year is notable for the national recognition received by several of our partnership programs. In September, the Department competed with over 70 applicants and won two national awards in conjunction with Pollution Prevention Week. The National Pollution Prevention Roundtable awarded the Department of Environmental Quality its Most Valuable Pollution Prevention award for two projects: 1) a writing award for an informational compact disk on mercury reduction sent to every school district in the state to help them meet the legislative mandate to remove mercury from schools by the end of 2004; and 2) a best program award for the Small Business Pollution Prevention Loan Program for its innovative approach to providing low-interest loans to small businesses that implement pollution prevention improvements. The Department received a third award, the "Champions for Change" award, from the National Hospitals for a Healthy Environment for its participation in a mercury reduction initiative focusing on Michigan's hospitals.

The day-to-day activities are equally important to our mission. The Department's Environmental Assistance Center, the one-call source for environmental questions and contacts, received nearly 35,000 calls from August 2001 through July 2002. That amounts to 140 calls each work day from people who want to do the right thing environmentally. We also provided pollution prevention technical assistance to over 1,100 people at Department-sponsored pollution prevention workshops, and promoted pollution prevention programs and ideas at 67 environmental events.

The benefits of source reduction and recycling are well documented, and these continue to fuel the persistent drive for environmental and economic success in Michigan. In the upcoming year, the Department will capitalize on the enthusiasm of our program participants and partners to further the adoption of pollution prevention by promoting the tools that lead to this, such as environmental management systems, technology demonstration programs, financial assistance, and on-site assessments.

The Department proudly presents this report and extends its gratitude to the many people across Michigan working to use our resources wisely and prevent tomorrow's environmental problems. By working together, we will ensure that the pollution prevention initiatives of today will serve as models for the preservation of our tomorrow.

Driving Change

POLLUTION PREVENTION PROGRAMS

Agriculture Pollution Prevention Program (AgP2 Program)

Guided by the Michigan AgP2 Strategy, this program continues to focus on preventing agricultural pollution while maintaining and improving on-farm profitability. In fiscal year 2002, the AgP2 Program extended its services to food processing and agricultural commodity organizations, saw 11 livestock farms complete the proactive Michigan Agriculture Environmental Assurance Program (MAEAP), as well as developed and supported projects under the Saginaw Bay Watershed Initiative Network. Additional initiatives have begun with on-farm poultry and dairy processing and the MAEAP Farmstead System, with results expected in 2003.

Clean Corporate Citizen Program (C3)

The C3 program welcomed 12 new facilities this year and celebrated its 53rd facility designation. This program continues to see growth as facilities committed to environmentally responsible operation and pollution prevention choose the C3 path. To build on the success of the program, this year workshops were held around the state on environmental management systems. As a result of these workshops, over 230 individuals representing auto manufacturing, auto suppliers, municipalities, universities, power plants, military establishments, food producers, plastics production, pharmaceuticals, defense contractors, non-profit groups, and environmental consulting firms were instructed on the methods for ensuring continual environmental improvement and proactive pollution prevention.

Dan Wyant, MDA Director; Joe Marhofer, Producer; and Russ Harding, DEQ Director attended Joe Marhofer's Three Way-Acres farm MAEAP verification.

Pollution Prevention

DOD P2 Alliance partners discuss the benefits of EMS at the program's first annual workshop.

Department of Defense (DOD)-State of Michigan Pollution Prevention Alliance (P2 Alliance)

In 2002, the DOD P2 Alliance revised its strategic plan to include on-site pollution prevention assessments at DOD facilities and conducted the first DOD workshop. This first annual workshop offered a variety of waste minimization topics, provided information on regulatory interface issues that affect defense installations statewide, and offered a breakout session on environmental management systems (EMS) to help satisfy requirements of Executive Order 13148. Additional program information, such as partner success stories, the Pollution Prevention Recognition Awards, and the Alliance's Strategic Plan, is available on the DOD web site.

Environmentally Preferred Purchasing (EPP)

The Department of Environmental Quality continued its work with other state departments to encourage environmentally preferred products purchasing. The effort is primarily educational as the Department of Management and Budget and, to a lesser extent, state departments have substantial autonomy in making purchasing decisions. This year, five new fact sheets were published pertaining to architectural paints, buying green power, environmentally preferred floor coverings, industrial cleaners, and re-refined motor oil. Other notable program accomplishments for 2002 include work with the Department of Transportation on a project proposal for fabricating guardrail components from recycled scrap tires and its work in helping the turf grass industry to develop an environmentally preferable purchasing guide.

Driving Change

Marina Pollution Prevention Initiative

The Department of Environmental Quality is working with the Michigan Sea Grant College and the Michigan Boating Industries Association to provide marinas and marine-related businesses with a forum for sharing pollution prevention technologies and provide encouragement to these businesses to take full advantage of available environmental, technical, and financial assistance programs. Partners are pursuing grants from Coastal Zone Management and the Great Lakes New Program Office to further their pollution prevention efforts. With nearly 1,000,000 registered boaters and over 1,000 operating marinas using Michigan's Great Lakes shoreline, inland lakes, and its extensive system of rivers and streams, this initiative has the potential to positively impact all Michigan citizenry.

Mercury Pollution Prevention Initiative

Michigan's mercury reduction efforts received national attention in 2002, winning the National Pollution Prevention Roundtable's *Most Valuable Pollution Prevention Program Publication Award* for publishing an interactive mercury elimination compact disk for educators. In a separate recognition program, the Department of Environmental Quality was acknowledged for its work to eliminate mercury from health care facilities by "Hospitals for a Healthy Environment" as one of the participants receiving the *Champions for Change Award*. The Department also participated with auto companies to evaluate the technical, logistical, and procedural factors associated with the removal of mercury convenience light switches from scrapped automobiles; participated on the Bi-National Toxics Strategy Mercury Committee; sought Clean Michigan Initiative funds to reimburse mercury collection at Clean Sweep sites; and continued the highly successful "Catch the Fever" Michigan Mercury Thermometer Exchange Program, recovering over 29,000 mercury thermometers to date.

Marina Initiative partners have implemented beneficial use of dredge materials through greenway and buffer strip enhancements.

Pollution Prevention

2002 Strategic Goals Program participants receive awards for achieving their pollution pevention goals.

Metal Finishing Pollution Prevention Initiative (MFP2I)

The MFP2I sponsored Retired Engineer Technical Assistance Program interns at six industrial facilities and worked with universities to conduct technological demonstration projects. During the summer of 2002, student interns successfully implemented rinse water reduction technology and similar practices, various types of paperboard and metal recycling programs, and energy efficiency projects at their respective companies. Under the initiative, Wayne State University teamed up with Reilly Plating in Melvindale, Michigan, to demonstrate a new approach to rinse water reduction that resulted in significant cost savings (see page 19 for a project overview). The MFP2I also funded environmental management system (EMS) training for Michigan metal finishers, which, upon completion, will lead to the development of a facility EMS and potentially a Clean Corporate Citizen designation. Although grant funding for the initiative ended in 2002, Department of Environmental Quality staff will continue to coordinate pollution prevention activities for the metal finishing community under this initiative.

Michigan Auto Pollution Prevention Partnership

Formerly known as the Auto Project, the Michigan Auto Pollution Prevention Partnership is the auto industry's collaborative effort to strengthen pollution prevention efforts throughout the industry. The partnership, with a new mission and objectives, recognizes the importance of all stakeholders to build pollution prevention into an intrinsic component of industry operations. Resources were focused on improving supplier awareness using professional and trade associations as conduits of information. With over 100 case studies and a comprehensive web site of auto-related information, the partnership continues to drive pollution prevention through supplier outreach and mentoring.

Driving Change

Michigan Business Pollution Prevention Partnership (MBP3)

The MBP3 is a long-standing partnership that has benefited from its members' dedication to continuous improvement. During the past year, 90 percent of partners established and recorded source reduction activities as part of their commitment to pollution prevention efforts at their facilities. Additionally, members committed to material substitution (35 percent), energy conservation (45 percent), water conservation (42 percent), beneficial reuse (30 percent), and recycling (75 percent). Utilizing workshops and electronic media, members share ideas on pollution prevention-oriented environmental management, sustainability, recycling, resource management, and environmentally preferred purchasing. Pfizer Global Research and Development and Yamaha Musical Instruments hosted two well-attended workshops this year, where members were able to share real-world experiences and provide input on the future of the program.

"The MBP3 has given our company an opportunity to demonstrate to the public and the government authorities that we are sensitive to the environment and resources that we consume in delivering a high quality product to our customers without regulatory intervention. It has further allowed us the flexibility to focus our efforts on the areas where the greatest environmental improvement can be made with existing plant resources, which are not necessarily the same as regulatory driven environmental programs. We have been an enthusiastic supporter of both the MBP3 and its founding principles."

. . .Terence Filipiak, AutoAlliance International, Inc.

Michigan Great Printers Project (MI-GPP)

In its sixth year, members of the MI-GPP remain committed to environmental stewardship in the printing and publishing industry, choosing pollution prevention goals ranging from recycling to implementing alternative technologies. Published in 2002, the brochures *Great Print Buyers Make a Difference* and *Small Business Pollution Prevention Loans and MI-GPP* provide buyers of print materials and commercial printers with information on pollution prevention. With additions to the MI-GPP web site, printers are now provided with descriptions and links to nearly 300 industry resources available on pollution prevention implementation.

Pollution Prevention

In 2002, Macomb County served over 1,200 households and collected approximately 65,000 pounds of material from its four satellite HHW collection sites.

Michigan Household Hazardous Waste (HHW) Collection Initiative

This initiative served over 3,300 Michigan households, diverting almost 90 tons of toxic waste from landfills, wastewater treatment facilities, and dumping. Oil-based paints, old mystery chemicals, unused pesticides, mercury devices, batteries, and other potential hazards came out of basements, garages, and attics all over the state to be properly collected, managed, and disposed of as a result of this initiative. Communities receiving HHW collection grants have pledged to continue services through the year 2008, and beyond.

Michigan Pulp and Paper Pollution Prevention Program (P5)

This year, the Michigan Pulp and Paper Environmental Council (MPPEC) merged with the newly formed Michigan Forest Products Council (MFPC). As a division of the MFPC, the MPPEC will represent environmental interests of this larger group of wood products and will provide the opportunity for broader goals, fresh ideas, new technology transfer, and greater pollution prevention accomplishments for the P5. As of December 2001, member mills had eliminated all electrical transformers containing polychlorinated biphenyls, and Michigan's kraft pulp mills had successfully eliminated elemental chlorine from their bleaching process. In 2002, program partners committed to reducing sewer losses, air emissions, water usage, and wastewater discharges; minimizing landfilling of solid wastes by finding practical uses; and promoting recycling, environmental management systems, and the use of reusable or rechargeable products. The program's *2002 Annual Report* will be available early 2003.

Driving Change

Michigan Turfgrass Environmental Stewardship Program (MTESP)

The MTESP leads the nation in golf course-related environmental stewardship and pollution prevention activities. With the golf industry in Michigan experiencing steady growth over the past few years, there has been rising concern about the potential for point source and non-point source pollution from both old and new courses. These concerns have provided an opportunity for Michigan to be progressive with innovative programs such as the MTESP. This program has enjoyed strong support in the promotion of voluntary stewardship practices, with nearly 220 facilities, or 25 percent, of Michigan's courses participating. The MTESP members are provided with increased opportunities for pollution prevention and compliance assistance related to golf course operation and maintenance activities. In keeping with pollution prevention enhancements has been the development of an environmentally preferable purchasing guide for golf course shop and maintenance facilities.

Pollution Prevention Technology Demonstration Program

The Department of Environmental Quality provides assistance for environmental technology development. These demonstration projects provide companies with the know-how and confidence critical for the adoption of innovative technologies. When showcased with industry leaders, these projects markedly accelerate the diffusion of innovative technologies within industrial sectors. Using this approach, the Environmental Science and Services Division successfully conducted and showcased four pollution prevention technology demonstration projects this fiscal year and saw nearly 70 industry peers participate in the on-site showcase demonstrations. Six-month follow-up studies further captured critical data illustrating the significant

MTESP partners are implementing innovative cleaning alternatives like this renovated equipment washing station that uses air instead of water to remove grass clippings.

Pollution Prevention

A Lansing area collection event accepted 29 tons of used electronics for recycling.

pollution prevention and economic benefits of each technology, showing a combined annual reduction in solid waste and wastewater generation of about 31,000 pounds and 21,000,000 gallons, respectively. The average annual cost saving to each company was over $52,000. Two technology demonstration projects, Master Finish's ultrasonic cleaning project and Reilly Plating's novel rinse water reuse project, are highlighted in the Pollution Prevention Partners' section of this report, beginning on page 16.

Recycling

In fiscal year 2002, the Department of Environmental Quality actively promoted the recycling of used electronics. Throughout the country, electronics are becoming a dominant waste stream constituent as the obsolecence of electronic products increases. From toys to computers, residential electronics contain hazardous materials such as lead, mercury, and cadmium that are of concern when targeted for disposal in local incinerators or landfills. In response, Michigan's Legislature introduced house bills banning cathode ray tubes from landfills and incinerators, as well as introduced a resolution seeking feasible solutions for safe management of electronic waste in Michigan; two counties received Clean Michigan Initiative funds for pilot programs offering information on how best to manage this growning waste steam; the Department of Environmental Quality provided an exemption that removed a regulatory barrier for communities to more easily collect residential electronics for recycling; and a new program web site was developed to assist residents and businesses in finding companies and local programs that collect electronics for recycling.

Driving Change

Retired Engineer Technical Assistance Program (RETAP)

The RETAP exceeded program goals by conducting 157 on-site assessments this fiscal year, and saw requests for services increase by 50 percent over last year due to direct marketing by the contractor. A new measurement survey proved highly successful in reporting the amount of waste reduced as a result of implementing RETAP recommendations. Examples of the reported reductions include a company that was able to save $22,000 annually through the establishment of a preventative maintenance program to reduce oils and leaks; an electroplater that was able to reduce peak electrical demand through steam line insulation and staggered equipment start-ups; and a synagogue that was able to divert over 1,000 pounds per month from being sent to the landfill through the establishment of a recycling program. Reporting companies also identified that over 75 percent of the RETAP recommendations are in the planning or implementation phase within one year of having their on-site assessment conducted. Technical assistance for the program continues to be provided by the Retired Engineer Technical Assistance Foundation, a Michigan-based, not-for-profit foundation.

Cam Metcalf from the Kentucky Pollution Prevention Center spoke to RETAP engineers and interns on integrating pollution prevention into manufacturing improvements.

Retired Engineer Technical Assistance Program (RETAP)-Pollution Prevention Internship Program

Eight students were awarded internships through the RETAP Pollution Prevention Internship Program, a partnership between the Department of Environmental Quality, Michigan's engineering colleges, and the business sector. Participating interns worked with RETAP assessors to successfully implement cost-effective pollution prevention and energy efficiency projects that ranged from metal and

Pollution Prevention

Engineering student interns assist companies and gain pollution prevention experience.

paper recycling to rinse water reduction technology at small- to medium-size manufacturing facilities. Students gained valuable pollution prevention experience that they will be able to apply throughout their professional careers, while hosting companies benefited from the interns' efforts and enthusiasm. An overview of the student intern's Ondeo-Nalco case study is provided on page 18 of this report. The agriculture industry will be the focus of the program in 2003.

Small Business Chemical Manufacturers' Pollution Prevention Initiative

This program provides pollution prevention and technical assistance to small chemical manufacturers through a multi-tiered approach involving demonstration projects, internships, waste assessments, resource awareness, and case study development. In fiscal year 2002, a pollution prevention technology demonstration grant was awarded to showcase the environmental and economic benefits of implementing an innovative pollution prevention technology at a small chemical manufacturing facility; two program partners hosted summer interns to investigate and implement pollution prevention within their manufacturing operations; and several facilities underwent waste reduction and energy efficiency assessments to identify significant pollution prevention opportunities within their operations. The accomplishments of one partner have been showcased on page 18 of this report, with additional partner accomplishments and pollution prevention resources available on the program's web site.

Driving Change

Small Business Pollution Prevention Loan Program

This year the loan program received national recognition from the National Pollution Prevention Roundtable for its creative design in partnering with lending institutions and for its effective pollution prevention results. Since the program's inception in 2000, over $1,300,000 in loans have been funded to 20 small Michigan businesses. The loan portfolio is well diversified and includes dry cleaners, orthodontists, agricultural producers, as well as a metal finisher, printer, plastics manufacturer, and auto repair business. Representing half of the loan awards, dry cleaners have been able to reduce their annual use of the hazardous cleaning solvent perchloroethylene by 50 to 90 percent as a result of implementing pollution prevention technologies. Collectively, recipients of Small Business Pollution Prevention Loans have contributed to an annual decrease in perchloroethylene purchases by over 24 tons, eliminated 2,000 pounds of plating chemicals, cut water usage by over 23 million gallons, reduced solid waste by over 17 tons, conserved over 12,000 kilowatts of electricity, and improved worker health and safety.

Michigan's Small Business Pollution Prevention Loan Program receives the Most Valuable Pollution Prevention Program Award at a ceremony in Washington , D.C.

POLLUTION PREVENTION FIELD OPERATIONS

District Office Services

The Environmental Science and Services Division's field operations program provides coverage to all Department of Environmental Quality district offices. This deployment of field staff furthers the department's goal of building pollution prevention capacity to meet local needs. Field staff worked with public health agencies, department regulatory staff, local government, educational institutions, trade associations, businesses, and industry to increase the adoption of pollution

Pollution Prevention

A Community Pollution Prevention Grant awarded to the City of Kalamazoo is focusing on public communication and marketing strategies to enhance innovative opportunities for beneficial reuse of dry Class A biosolids generated in the treatment of wastewater.

prevention. They served as a resource to watershed groups, lake-wide management groups, and local sustainable business forums. Field staff also provided assistance on specific initiatives, such as a partnership with the City of Marquette Water Utility to develop a use for methane from the wastewater treatment plant, as well as participated in a Department open house for the Cadillac School System's fifth grade students in celebration of Earth Science Week. Staff worked with local governments to implement innovative pollution prevention projects and demonstrations, such as the City of Grand Rapids' project to convert waste vegetable cooking oil from restaurants into biodiesel fuel for use in fleet vehicles, and the Kalamazoo/Battle Creek International Airport's state-of-the-art de-icing facility to reduce glycol usage by 50-55 percent.

Community Pollution Prevention Grant Program

A new program in 2002, the goal of the Community Pollution Prevention Grant Program is to foster partnerships and sustainability by bringing local government, businesses, planning agencies, and residents together to create change through pollution prevention. The program is funded by appropriations from unclaimed beverage container deposits. In its first year, three community-level pollution prevention grants were awarded for projects involving waste stream recycling of fluorescent light tubes (mercury) and waste motor oil filters, the reduction of biological oxygen demand and nutrient levels in wastewater generated at food processing plants, and the beneficial use of bio-solids as a soil amendment and fertilizer.

Driving Change

Local Health Department Partnership

The Department of Environmental Quality and representatives from the local public health and environmental departments (LHEDs) have worked hard to maintain the partnership's focus on critical activities at the local level. Environmental issues of most importance to the LHEDs are food service, groundwater protection, wastewater treatment, surface water, and public education. Department staff work directly with environmental health professional associations to provide pollution prevention concepts and maintain communication at the staff level. Through the partnership, publications on pollution prevention have been distributed at household hazardous waste collection sites and at environmental expos and conferences. In addition, LHEDs have undertaken special pollution prevention projects with assistance from the Regional Pollution Prevention Grant Program and the Community Pollution Prevention Grant Program.

Regional Pollution Prevention Grant Program

This year the Environmental Science and Services Division provided oversight for the Regional Pollution Prevention Grant projects funded through the Clean Michigan Initiative. A total of $800,000 in funding went to 10 grantees through this program to fund regional pollution prevention projects, resulting in measurable reductions in the generation of waste. Grants were targeted at regions of the state with environmentally sensitive natural resources, such as the Lake Superior Basin and Lake St. Clair. Public and private organizations matched grant funds to implement pollution prevention projects targeting source reduction, reuse, and recycling.

A grant project initiated in northern Michigan incorporated over 15,000 pounds of fish waste, otherwise destined for disposal, into a pilot compost pile.

Pollution Prevention

The benefits of integrated pest management are illustrated at a tour conducted as part of the Michigan State University grant project.

Grant project progress since implementation:

- Northern Economic Initiatives Corporation in Marquette worked with fish processors in the Lake Superior Basin area to implement and develop compost for specialty markets, such as greenhouse operations, bagged potting soils, and the organic growers markets. The project has begun composting to recycle 15,000 pounds of fish processing waste and will provide guidance and recommendations for implementing a large-scale operation.
- Central Lake Superior Watershed partnership in Marquette implemented a community-based pollution prevention program for Lake Superior that provides technical assistance to businesses for reducing the storm water impacts of critical pollutants to Lake Superior. A comprehensive strategy for implementing the business education component of the project has been developed, and the storm water monitoring stations have been identified and established. In addition, the project has been featured in several public presentations and publications.
- Washtenaw County Division of Public Works is establishing the Washtenaw County Computer Recovery Program that will recover lead, metals, mercury and plastics from computers. Through the grant, the county surveyed over 800 local businesses to assess the need for a permanent electronic equipment reuse and recycling program. The findings, which also included an assessment on the quality of electronic equipment available for recycling/reuse, were presented at the 2002 Michigan Recycling Coalition's Annual Education Conference.
- The City of Detroit is implementing a Salvage Yard Pollution Prevention pilot program that will work with salvage yards in Southeast Michigan to promote best management practices and pollution prevention. The Automotive Recyclers of Michigan has worked with the city to identify possible sites for demonstration projects.

Driving Change

- Delta County and Menominee District Health Department are implementing a regional approach to reducing critical pollutants generated from medical waste. The grantees conducted a video conference which included representatives from 11 Upper Peninsula hospitals and the Upper Peninsula Health Care Network to learn about the available resources for the reduction of critical pollutants generated from medical waste.
- Michigan State University provided technical assistance to the apple growing industry on Integrated Pest Management to reduce broad-spectrum insecticides by 50 percent. Eighteen commercial orchards participated in the first commercial deployment of plum curculio traps, with the goal of monitoring populations and making management decisions based on captures. Program participants have reduced the use of organophosphorous insecticide sprays for beetle control. Hand-applied and sprayable pheromone formulations are being evaluated as controls for leafrollers.

Regulatory Integration

Field staff from the Environmental Science and Services Division facilitated the integration of pollution prevention into all Department of Environmental Quality programs by working with department staff and serving as a resource to provide assistance to regulated facilities. Field staff accompanied inspectors to facilities, contributed to proposals for Supplemental Environmental Projects used in enforcement cases, and provided follow-up services to businesses and institutions wishing to implement pollution prevention. To better utilize the resources available to the department, staff developed a one-page informational handout on general Department publications and pollution prevention programs.

2002 Pollution Prevention Integration awards ceremony celebrating regulatory staff that have gone beyond their regular duties to advocate pollution prevention.

Pollution Prevention

The Michigan Great Printers Project (MI-GPP) was initiated in 1995 to promote pollution prevention as a standard practice of the printing industry.

Allegra Print and Imaging of Grand Rapids has been a dedicated member of this project since 1999.

POLLUTION PREVENTION PARTNERS

Our partners have made significant reductions in waste. Here are some selected examples of their accomplishments.

Allegra Print and Imaging Converts to Computer-to-Plate

Allegra Print and Imaging of Grand Rapids is a member of the Michigan Great Printers Project and the first printer in Michigan to have a project approved under the Small Business Pollution Prevention Loan Program. As an environmentally conscious, small commercial printer, Allegra sought a low-interest loan to upgrade its conventional printing equipment to a computer-to-plate imaging system – knowing that as technology changes in the printing industry, opportunities are uncovered that offer greater efficiencies in workflow, improvements in quality, and a substantial reduction in the amount of materials required for use and disposed. By installing the computer-to-plate imaging systems, Allegra was able to completely eliminate the need for negatives and metal plates at its shop and substantially decrease the amount of chemistry used in platemaking systems, while realizing an estimated annual economic savings of $10,000. Allegra's yearly pollution prevention benefits include:

- A reduction in the amount of chemical solutions used by 280 gallons;
- Elimination of processing and disposal for 3,700 square feet of film; and
- Elimination of 1,320 metal plates.

Driving Change

Master Finish Company Goes Ultrasonic

Technology demonstration projects can greatly facilitate the awareness and adoption of innovative pollution prevention technologies, particularly within industry sectors. Master Finish Company, located in Grand Rapids, Michigan, received a matching pollution prevention Technology Demonstration Program grant to evaluate the effectiveness of ultrasonic cleaning technology on a soak clean tank used in its electroplating operation and to showcase the technology to others in the plating industry.

Prior to initiating the project, Master Finish's cleaning process consisted of a preliminary (perchloroethylene) vapor-degreasing step, followed by a two-stage aqueous alkaline process installed on an electroplating line. To reduce time, temperature, and chemical concentrations in the parts cleaning process, Master Finish proposed the installation of ultrasonic equipment in a secondary soak cleaner. Unlike traditional cleaning processes, ultrasonic cleaning uses high frequency "vibration" to force dirt off of the substrate. Master Finish found that after integrating omni-directional, ultrasonic cleaning technology within their metal parts cleaning process, they were able to:

- Eliminate the preliminary (perchloroethylene) vapor-degreasing step;
- Lower bath temperatures by up to 50 degrees Fahrenheit;
- Reduce cleaning times by 50 percent or more;
- Realize a natural gas savings of about 8,100 cubic feet;
- Reduce water usage by 67 percent and chemical usage by 80 percent;
- Improve productivity; and
- Create a safer work environment.

After successful completion of the project, Master Finish held a showcase demonstration at their facility to encourage others in the industry to adopt

On-site technology demonstration projects conducted under real-world conditions provide companies with the know-how and confidence critical for the adoption of innovative technologies.

Using pressure washers to clean mixing tanks was one of many ways that Ondeo-Nalco has significantly reduced its wastewater generation.

ultrasonic cleaning technology. The showcase demonstration included a description of the ultrasonic cleaning technology, a question-and-answer period, and a shop demonstration.

Ondeo-Nalco Company Gets Results from Student Intern Assistant

Ondeo-Nalco, a specialty chemical producer located in Jackson, Michigan, manufactures over 500 chemical products consisting of metalworking and cleaning fluids. As a small company with less than 30 employees, Ondeo-Nalco sought assistance from the Retired Engineer Technical Assistance Program-Pollution Prevention Internship Program to evaluate its current processes, make recommendations on waste minimization, and implement pollution prevention recommendations.

At the Ondeo-Nalco facility, a student intern was able to evaluate many different sources contributing to the waste stream and establish baseline waste data for total daily waste generation, total daily production, and amount of waste generated for various cleaning procedures per product. As a result of this evaluation, several waste minimization projects were implemented at the facility, such as vat rinse water recycling and boiler blow-down process changes. By implementing process changes that were both technical and non-technical in nature, the facility estimates that annually it was able to reduce wastes by 14,337 gallons and save $6,600 in reduced hauling and treatment fees.

An additional focus of the project was to make employees at Ondeo-Nalco aware of the facility's commitment to waste minimization. To accomplish this goal, a Waste Minimization Team was organized at the facility to strengthen employee awareness, set goals for waste reduction, generate ideas for reductions, and make evaluations.

Driving Change

Reilly Plating Showcases Profitable Pollution Prevention

With assistance from the Pollution Prevention Technology Demonstration Program, Wayne State University was able to work with Reilly Plating Company to demonstrate the effectiveness of profitable pollution prevention (P3) technology developed for the electroplating industry. This new in-process technology looked to minimize source wastewater reduction in electroplating processes by taking the unique approach, "how dirty can a part be prior to plating."

The new wastewater reduction technology was implemented on Reilly Plating's zinc chloride plating line and involved three phases: 1) process analysis and data collection; 2) computer software simulations to identify opportunities for water reduction using data collected in phase one; and 3) implementing and testing the wastewater reuse system by installing piping and pumps to physically modify the fresh water inlet flows and reuse rinse water. The project focused on the reduction of fresh water use through the maximum reuse of used water in different rinse steps. Throughout the course of the project, a number of variables were monitored (total dissolved solids, conductivity, oil and grease concentration, alkalinity, and other parameters), and relationships were used in a computer algorithm in an effort to reduce fresh water usage.

The Reilly Plating Company technology demonstration project was successfully implemented and completed with a showcase demonstration tour held on August 14, 2002. Annual pollution prevention benefits of the wastewater reuse project include:

- Reductions in water usage by 27 percent;
- A decrease in rejected parts by 2 percent;
- Significant reductions in maintenance and defect recycling costs; and
- Cost savings of approximately $48,000 (net investment of $2,297).

"Implementation of this project has benefited Reilly Plating Company by reducing the cost of chemical and water purchases thus allowing us to maintain our viability during this ever-tightening economic climate."

. . .Kenneth Swift, Reilly Plating

APPENDIX A: Pollution Prevention Projects and Assistance Programs

The Michigan Department of Environmental Quality, Environmental Science and Services Division, provides pollution prevention information and technical support to companies, institutions, and communities to reduce pollution, improve the environment, and save money. In addition to the following programs and services listed, the Environmental Science and Services Division provides compliance assistance and education and outreach services. For further information on pollution prevention programs and services contact the Environmental Assistance Center at 800-662-9278 or visit www.michigan.gov/deq and select Pollution Prevention from the left side bar.

Pollution Prevention Partnerships and Initiatives

Agriculture Pollution Prevention Program (AgP2) - promotes reduction or elimination of environmental contamination sources in agriculture through a partnership between the Department of Environmental Quality and the Department of Agriculture. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Business Partnerships and finally Agriculture.

Clean Corporate Citizen Program (C3) - provides public recognition and certain regulatory benefits for companies, municipalities, and institutions that have demonstrated environmental stewardship and a strong environmental ethic. For additional information visit **www.michigan.gov/deq** and select Assistance & Support Services from the left side bar, then Environmental Incentives and finally Clean Corporate Citizen.

Department of Defense-State of Michigan Pollution Prevention Alliance (DOD P2 Alliance) - facilitates pollution prevention information and technology exchange among representatives from the Department of Defense, National Guard, Army, Air Force reserve bases, armories, special divisions, United States Environmental Protection Agency Region 5 representatives, and Environmental Science and Services Division. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Initiatives for Governments and finally US DOD Michigan Alliance.

Environmentally Preferred Purchasing (EPP) - promotes the purchase of products with less effect on human health and the environment, taking into account raw materials, production, manufacturing, packaging, distribution, reuse, operation, maintenance, and disposal of the product. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Initiatives for Businesses and finally Env. Purchasing.

Marina Pollution Prevention Initiative - increases awareness and promotes use of marina and boating Best Management Practices to alleviate pollution. For additional information

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visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Business Partnerships and finally Eco-friendly Boating.

Mercury Pollution Prevention Initiative - promotes elimination of nonessential uses of mercury and provides materials on design modifications and product substitution to eliminate the potential hazards posed by mercury spills and improper disposal. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Initiatives for Businesses and finally Mercury P2.

Michigan Auto Pollution Prevention Partnership - promotes pollution reductions in vehicle manufacturing through a voluntary pollution prevention and resource conservation partnership among DaimlerChrysler, Ford, General Motors, and the Department of Environmental Quality. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Business Partnerships and finally Automotive.

Michigan Business Pollution Prevention Partnership (MBP3) - encourages businesses, organizations, and institutions to apply creative, cost-effective techniques to reduce waste and prevent the release of hazardous substances. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Business Partnerships and finally MI Business Partnership.

Michigan Great Printers Project (MI-GPP) - provides technical assistance, pollution prevention workshops, and case studies to printers who are committed to minimizing impacts on health and the environment. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Business Partnerships and finally Great Printers.

Michigan Pulp and Paper Pollution Prevention Program (P5) - promotes environmental improvement in concert with economic growth and security in the pulp and paper industry through a partnership between the Department of Environmental Quality and the Michigan Pulp & Paper Environmental Council. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Business Partnerships and finally Pulp & Paper.

Michigan Turfgrass Environmental Stewardship Program (MTESP) - advances the environmental stewardship of the golf industry and recognizes environmental achievements through a partnership with the turfgrass industry, state agencies, and Michigan State University. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Business Partnerships and finally Turfgrass Stewardship.

Pollution Prevention Field Operations

Field staff are located in Department of Environmental Quality district offices to offer environmental assistance at the local level. They meet with local governments, businesses, and

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environmental organizations to provide assistance in the programs offered by the Environmental Science and Services Division. Field staff work with county public health and environmental departments to promote pollution prevention and environmental incentive programs and services, as well as provide compliance assistance and work with district office regulatory program staff to integrate pollution prevention into air, waste, and water programs.

Community Pollution Prevention Grant Program – provides matching funds to local government, businesses, planning agencies, and residents that partner to achieve measurable waste reductions through community based pollution prevention projects. For additional information visit **www.michigan.gov/deq** and select Assistance & Support Services from the left side bar, then Financial Assistance and finally Community P2 Grants.

Local Health Department Partnership - enhances and increases the practice of pollution prevention in the health care community through a partnership between the Department of Environmental Quality and the Michigan Association for Local Public Health. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Initiatives for Governments and finally Local Health Depts.

Regulatory Integration - promotes pollution prevention to businesses, industry, and municipalities utilizing the outreach potential of regulatory staff through permitting, rulemaking, compliance inspection, and enforcement program areas. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Regulatory Integration.

Pollution Prevention Technical Assistance

The Technical Assistance Program provides assistance to Michigan businesses, institutions, and communities regarding pollution prevention. This includes helping businesses become more efficient in their operations and finding alternatives to using hazardous materials. For additional information visit **www.michigan.gov/deq** and select Assistance & Support Services from the left side bar, then Technical Assistance.

Metal Finishing Pollution Prevention Initiative (MFP2I) - improves coordination and strengthens the delivery of pollution prevention services to Michigan's metal finishing industry through assistance, technology demonstration projects, and education outreach. Assistance is provided through a partnership with the Michigan Association of Metal Finishers, the National Center for Manufacturing Sciences, the Michigan Manufacturing Technology Center, and the Michigan

Driving Change

Water Association. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Business Partnerships and finally Metal Finishing.

Pollution Prevention Technology Demonstration Program - provides matching grants to qualified businesses and institutions for implementing technology demonstration projects that achieve measurable reductions in waste generation, enhance process efficiency, and improve overall business profitability. The implemented technology must be transferable and will serve as a showcase to be shared with other businesses or industries. For additional information contact the Environmental Assistance Center at 800-662-9278.

Recycling - promotes source reduction and encourages recycling through the Michigan Materials Exchange Service, the Michigan Recycled Materials Market Directory, and the Recycled Products Directory. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Recycling.

Retired Engineer Technical Assistance Program-Pollution Prevention Internship Program - provides engineering students to small and medium size companies for work on projects that integrate pollution prevention practices and technologies into manufacturing operations. Assistance is provided through a partnership between the Department of Environmental Quality, Michigan institutions of higher education, the Retired Engineer Technical Assistance Program, and businesses. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Initiatives for Businesses and finally RETAP Internship Program.

Small Business Chemical Manufacturers' Pollution Prevention Initiative - enhances and increases pollution prevention practices among small- and medium-size chemical manufacturers through technical assistance, technology demonstration projects, workshops, and distribution of resource information. Assistance is provided through a cooperative project between the Environmental Science and Services Division and Michigan's chemical manufacturing industry. For additional information visit **www.michigan.gov/deq** and select Pollution Prevention from the left side bar, then Initiatives for Businesses and finally Small Chemical Mfg.

Clean Michigan Initiative Pollution Prevention Activities

The Clean Michigan Initiative (CMI), created under Part 196 of the Natural Resources and Environmental Protection Act (NREPA) in 1998, allocated $20,000,000 to promote pollution prevention activities. A portion of the CMI funds have been dedicated to the Retired Engineer Technical Assistance Program, the Small Business Pollution Prevention Loan Program, and for support of two community grant programs.

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Michigan Household Hazardous Waste Collection Initiative (HHWC) - provides helpful information about disposal options and hazardous materials as well as grants to increase the number of collection sites offered throughout the state. For additional information visit **www.michigan.gov/deq** and select Assistance & Support Services from the left side bar, then Financial Assistance and finally Household Hazardous Waste Grants.

Regional Pollution Prevention Grant Program - provides grants to promote innovative pollution prevention approaches to reduce the generation of waste and critical pollutants in the state. For additional information visit **www.michigan.gov/deq** and select Assistance & Support Services from the left side bar, then Financial Assistance and finally Regional P2 Grants.

Retired Engineer Technical Assistance Program (RETAP) - utilizes experienced, retired, technical professionals to provide on-site assessments that identify opportunities to improve process efficiency and save money. This assistance is non-regulatory, confidential, provided free of charge, and is available to Michigan businesses with less than 500 employees. For additional information visit **www.michigan.gov/deq** and select Assistance & Support Services from the left side bar, then Technical Assistance and finally RETAP.

Small Business Pollution Prevention Loan Program - provides low-interest loans, for up to $100,000, to small businesses seeking to reduce environmental waste created or generated at their facility. Loans to implement pollution prevention projects are made through shared financial participation with a business's lending institution. For additional information visit **www.michigan.gov/deq** and select Assistance & Support Services from the left side bar, then Financial Assistance and finally Small Business P2 Loans.

APPENDIX B: List of Partners and Stakeholders as of September 2002

The Michigan Department of Environmental Quality, Environmental Science and Services Division, would like to thank all the organizations and individuals who have assisted in the development and implementation of pollution prevention activities and initiatives during the fiscal year. Every attempt was made to include all participants. We apologize if we have inadvertently omitted any name.

Clean Corporate Citizen Program

ADAC Automotive Trim, Grand Rapids (since Aug. 2002)
ARVCO Containers, Kalamazoo (since Jul. 2002)
Baker Furniture, Holland (since May 1998)
Cascade Engineering, Grand Rapids (since Jul. 2002)
Collins & Aikman Corporation, Westland (since Jan. 2002)
Consumers Energy-J.R. Whiting Plant, Erie (since May 1998)
Consumers Energy-Parnell Road Office Complex, Jackson (since Dec. 1998)
DaimlerChrysler Sterling Heights Assembly Plant, Sterling Heights (since Oct. 1997)
Dearborn Mid-West Conveyor, Taylor (since Dec. 2001)
Delphi Energy & Engine Management Systems, Grand Rapids (since Sep. 1997)
Demmer Corporation-Delta Plant, Lansing (since Nov. 2000)
DENSO Manufacturing Michigan, Inc., Battle Creek (since Dec. 1998)
Detroit Edison-Fermi 2 Power Plant, Newport (since Aug. 2000)
DeWitt Barrels, Inc., Grand Rapids (since Oct. 1999)
DuPont Mt. Clemens Plant, Mt. Clemens (since Feb. 1999)
Ford Motor Company-Automatic Transmission New Product Center, Livonia (since Nov. 1999)
Ford Motor Company-Engine Manufacturing Development Operations, Allen Park (since Sep. 2001)
Ford Motor Company-Romeo Engine Plant, Romeo (since Nov. 1999)
Ford Motor Company-Van Dyke Plant, Sterling Heights (since Oct. 1997)
General Motors-Orion Assembly Center, Lake Orion (since Sep. 2002)
General Motors-Pontiac Centerpoint Campus-Validation Center, Pontiac (since Apr. 2002)
General Motors Powertrain-Livonia Engine Plant, Livonia (since May 2002)
General Motors Powertrain-Warren Transmission Plant, Warren (since Aug. 2000)
Grayling Generating Station, Grayling (since Mar. 2001)
Great Lakes Gas Transmission, Compressor Station #8, Crystal Falls (since Oct. 2000)
Great Lakes Gas Transmission, Compressor Station #10, Naubinway (since Oct. 2000)
Great Lakes Gas Transmission, Compressor Station #10A, Brevort (since Oct. 2000)
Great Lakes Gas Transmission, Compressor Station #11, Boyne Falls (since Oct. 2000)

Pollution Prevention

Great Lakes Gas Transmission, Deward Meter Station, Frederic (since Oct. 2000)
Great Lakes Gas Transmission, Farwell Compressor Station #12, Lake (since Oct. 2000)
Great Lakes Gas Transmission, Otisville Compressor Station # 13, Otisville (since Oct. 2000)
Great Lakes Gas Transmission, Rapid River Compressor Station #9, Rapid River (since Oct. 2000)
Great Lakes Gas Transmission, Sault Ste. Marie Meter Station, Sault Ste. Marie (since Oct. 2000)
Great Lakes Gas Transmission, St. Clair Meter Station, St. Clair (since Oct. 2000)
Great Lakes Gas Transmission, Wakefield Compressor Station #7, Wakefield (since Oct. 2000)
Knoll, Inc.-Grand Rapids Manufacturing Facility, Grand Rapids (since Jul. 1998)
March Coatings, Inc.-Plant 1, Brighton (since Jan. 2000)
March Coatings, Inc.-Plant 2, Brighton (since Jan. 2000)
Mark IV Automotive, Big Rapids (since Aug. 2000)
NorthStar Print Group-Norway Operation, Norway (since Dec. 1999)
Pfizer Global Research and Development, Ann Arbor (since Apr. 2002)
Presque Isle Power Plant, Marquette (We Energies), Marquette (since Oct. 1998)
Smurfit-Stone Container Corporation-Ontonagon Mill, Ontonagon (since Jan. 1998)
TAC Manufacturing, Inc., Jackson (since Oct. 1999)
T.E.S. Filer City Station, Filer City (since Dec. 1999)
TRW Automotive, Fowlerville (since Apr. 2002)
Unified Industries, Inc., Howell (since Sep. 2001)
Visteon Corporation-Chesterfield Plant, Chesterfield (since Mar. 2000)
Visteon Corporation-Sheldon Road Plant, Plymouth (since Jul. 1999)
Visteon Corporation-Milan Plant, Milan (since Feb. 2002)
Visteon Corporation-Utica Plant, Shelby Township (since Dec. 1999)

Department of Defense-State of Michigan Pollution Prevention Alliance

Air Guard Base, Battle Creek
Air Guard Base, Selfridge
Air Guard Combat Readiness Training Center, Alpena
Defense Logistics Information Services, Battle Creek
Defense Reutilization and Marketing Operations, Selfridge
Defense Reutilization and Marketing Services, Battle Creek
Detroit Arsenal
EPA Region 5
Michigan Army National Guard (Department of Military Affairs)
Tank Automotive Research Development and Engineering Center, Detroit
U.S. Army Northern Regional Environmental Center
U.S. Army Reserves

District Office Service Partners

City of Grand Rapids
City of Kalamazoo Water Reclamation Plant
Detroit River RAP P2 Action Team
Detroit Wastewater Treatment Plant

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Environmental Health Directors Forum
Golden Refrigerants
Good Neighbors United Initiative
Lacks Enterprise, Inc.
Michigan Association of Local Environment Health Administrators
Michigan Association of Local Public Health
Michigan Environmental Health Association Education Committee
Michigan Recycling Coalition
Michigan Water Environment Association Industrial Pretreatment Committee
Muskegon County Environmental Coordinating Committee
Oakland County Solid Waste Services Division
Recycling Electronics and Pollution Prevention Municipal Consortium
West Michigan Electronics Recycling Coalition

Metal Finishing Pollution Prevention Initiative

Allegan Metal Finishing Co.
Allied Finishing, Inc.
Apollo Plating, Inc.
Benton Harbor-St. Joseph Wastewater Treatment Plant
Curtis Metal Finishing
Decc Co., Inc.
Detroit Water and Sewer Department
Diamond Chrome Plating, Inc.
Electroplating Industries, Inc.
Elm Plating Company
Hi-Tech Coatings, Inc.
Howard Plating Industries, Inc.
K.C. Jones Plating Co.
Lansing Plating Co.
Lansing Water and Sewer Department
Lorin Industries
March Coatings
Marsh Plating Corp.
Masco Corporation
Master Finish Co.
Meridian Automotive Systems
Michigan Association of Metal Finishers
Michigan Automotive Compressors
Michigan Manufactures Association
Michigan United Conservation Club
Midwest Plating Co.
National Center for Manufacturing
National Wildlife Federation
Seyburn, Kahn, Ginn, Bess, Deitch & Serlin, P.C.
Tawas Plating Co.
Valley Chrome Platers
Wayne County Department of Public Services
Wayne State University
Wyoming Wastewater Treatment Plant
Ypsilanti C.U.A.

Michigan Agriculture Environmental Assurance Program

Institute of Water Research
Michigan Allied Poultry Industries, Inc.
Michigan Association of Conservation Districts
Michigan Cattleman's Association
Michigan Corn Growers Association
Michigan Custom Manure Applicators Association
Michigan Department of Agriculture
Michigan Department of Environmental Quality
Michigan Farm Bureau
Michigan Integrated Food and Farming Systems
Michigan Milk Producers Association
Michigan Pork Producers Association
Michigan Soybean Promotion Committee
Michigan State University
Michigan State University Extension
Michigan Township Association
Michigan United Conservation Clubs

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Saginaw Bay Watershed Initiative Network
USDA National Resource Conservation Service

Michigan Auto Pollution Prevention Partnership

DaimlerChrysler Corporation
Ford Motor Company
General Motors Corporation

Michigan Business Pollution Prevention Partnership

Access Business Group
AEC – Manchester Stamping
Alpha Plastics, Inc.
American Axle & Manufacturing-Detroit Gear and Axle
American Electric Power-Nuclear Generation
ANR Pipeline Company
Applied Environmental
ARVCO Container Corporation
Associated Petroleum Industries of Michigan
ATOFINA Chemicals, Inc.
Atomic Cleaning Systems LLC
AutoAlliance International, Inc.
Automatic Spring Products Corporation
Baker Furniture
BASF Corporation, Wyandotte Site
Battery Solutions Inc.
Bear Truss, Inc.
Behr Industries Corporation
Belle Maer Harbor
Betz Industries
BLDI Environmental & Safety Management
Borg Warner Cooling Systems
BP Amoco Company
Brownrigg Companies, Ltd.
Cadillac Renewable Energy
Campbell & Company
Capital City Associates
Capitol Group Governmental Consultants
Cascade Engineering
Chemical Management Associates Inc.
Chivas Industries
City of Grand Haven
City of Wyoming-Clean Water Plant
C-Mar Products Inc.
Coldwater Board of Public Utilities
Collins & Aikman, Westland Operations
Colonial Press, Inc.
Complete Builders, Inc.
Consumers Energy-Adrian Service Center
Consumers Energy-BC Cobb Plant
Consumers Energy-JC Weadock Plant
Consumers Energy-JH Campbell Complex
Consumers Energy-JR Whiting Plant
Consumers Energy-Parnall Road Office Complex
Corsair Engineering, Inc.
Crystal Flash
Cyltec LLC
Delphi Automotive Systems
Delta College
Demmer Corporation-Delta Plant
DENSO Manufacturing Michigan, Inc.
Depor Industries, Inc.
Detroit Edison Company
Detroit Edison-Fermi 2 Plant
DeWitt Barrels
Donnelly Corporation
Douglas Cleaners
Dow Corning Midland Plant
DuPont Automotive, Mt. Clemens Site
E & E Manufacturing Co., Inc.
Eagle Ottawa Leather Company-Grand Haven
Eagle Ottawa-Rochester Hills, Ltd.
East Jordan Iron Works
Eaton Aeroquip Inc.-Jackson
Eaton Corporation PSCO Ann Arbor

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Eaton Corporation-Rochester Hills
Eaton Corporation-Saginaw
Electrical Design and Control
Elm Plating Company
Envirologic Technologies, Inc.
Environmental Health Resources Inc.
ESCO Company Limited Partnership
Evans Tempcon
Ford Motor Company-ATNPC
Ford Motor Company-Livonia Transmission
Foundry Association of Michigan
Four Winns, Inc.
General Motors-Orion Assembly Center
General Motors-PCC Validation
General Motors-Pontiac East Assembly Plant
General Motors Powertrain-Bay City Plant
General Motors Powertrain-Flint Components Operations
General Motors Powertrain-Livonia Engine
General Motors Powertrain-Romulus Engine Plant
General Motors Powertrain-Romulus Transmission
General Motors Powertrain-Saginaw Malleable Plant
General Motors Powertrain-Saginaw Metal Castings
General Motors Powertrain-Warren Transmission
General Oil Company, Inc.
Genesee Power Station
Genesys Health System
Georgia-Pacific Corporation-Milan
Gil-Mar Manufacturing Company
Grayling Generating Station
Great Lakes Contracting
Great Lakes Gas Transmission Company
Harry Major Machine & Tool
Haworth, Inc.
Hazekamp Meats
Hemlock Semiconductor
Herman Miller, Inc.
Huron, Inc.
Inalfa/SSI Roof Systems
Inland Waters Pollution Control, Inc.
International Foam and Trim
Irwin Seating Company
Jan's Professional Drycleaners
Keykert USA
Knoll Inc.
Magni Industries, Inc.
Marathon Ashland Petroleum, LLC
March Coatings, Inc.
March Coatings-Plant 2
Marine Pollution Control Corporation
Mark IV Automotive
Matrix System Automotive Finishes, Inc.
Mayco Plastics, Inc.
McCormick Enterprises, Inc.
Memorial Healthcare Center
Meridian Automotive Systems-Canton
Meridian Automotive Systems-Detroit
Meridian Automotive Systems-Ionia Operations
Meridian Automotive Systems-Paint Facility
Meridian Automotive Systems-Plant 1
Meridian Automotive Systems-Plant 5
Meridian Automotive Systems-Plant 7
Michigan Boating Industries Association
Michigan Chemical Council
Michigan Consolidated Gas Company
Michigan Institute of Laundering and Drycleaning
Michigan Seat Company
Mid-West Instrument
MWP Inc.-Pleuco Technologies Division
Ondeo-Nalco, Jackson Plant
Pfizer Global Manufacturing
Pfizer Global Research and Development
Pharmacia & Upjohn Company
Pioneer Foundry Company, Inc.

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Polar Environmental Service Corporation
RMT, Inc.
Ronningen Research & Development Company
Sackner Products-Unit of Jason Inc.
Saugatuck Yacht Service
Schefenacker Vision Systems USA, Inc.
Siemens Automotive Corporation
Solutia, Inc.
Sparrow Health System
SQS, Inc.
Steelcase, Inc.
Sunshine Prairie Farm
TAC Manufacturing, Inc.
Taplin Environmental Contracting Corporation
Taylor Building Products
T.E.S. Filer City Station
Tesco Engineering
The Traverse Group
Tower Marine
TriMedia Consultants
United States Postal Service, Lansing Branch
Universal Coating, Inc.
Vico Products Company
Visteon Automotive Systems-Sheldon Road Plant
Wacker Silicones Corporation
W.E.S. Corporation
Wisconsin Electric Power-Presque Isle Plant
Yamaha Musical Products

Michigan Great Printers Project

A & E Printers
A-1 Printing & Copy Center
Access Business Group
Action Printing
Adair Printing
Allegra Print & Imaging, Grand Haven
Allegra Print & Imaging, Grand Rapids
Allegra Print & Imaging, Holland (2 locations)
Allegra Print & Imaging, Lansing
Allegra Print & Imaging, Portage
Allegra Print & Imaging, Royal Oak
Allegra Print & Imaging, Wixom
Alphagraphics
American Ink
Amerikal, Inc.
Aquila Printing
Arrow Swift
ASAP Printing
Book Concern Printers
BRD Printing Inc.
Bryant Printing
Business Cards Plus
Business Imaging Group
Champion Printing and Advertising
Clarke American
Classic Printers
Classic Printing, Inc.
Colonial Press, Inc.
Copy Options, Inc.
Copy Quick
Craft Press Printing
Danielson Color Print
Delta Printing Company, Inc.
Dickinson Press
E&G Printing Service, Inc.
Earle Press Printing
Econo Print, Inc.
Edwards Brothers, Inc.
EPI Printers
Etheridge Company, The
Executive Printing Services
Falcon Printing
Fidlar Doubleday
First Impression Printing
Flashes Publishers
F.P. Horak Company, The
Fullserv, Inc.
Gardner Printing
G-Graphics
Goetzcraft Printers
Gonzalez Integrated Marketing, Inc.

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Grandville Printing
Graphic Enterprises, Inc.
Graphics 3, Inc.
Hatteras Printing
Holland Sentinel, The
Homewood Press, Inc.
Howard Printing
Huron Valley Printing & Imaging
Ideal Printing Company
Image Masters Precision Printing
Impressions Printing Inc.
Inco Graphics
Ingham County Printing Office
International Minute Press, Ann Arbor
International Minute Press, Farmington Hills
International Minute Press, Portage
IPC Communications Services
Janutol Printing Co.
JB Printing
Jet Speed Printing Company
Jiffy Print, Inc., Kalamazoo
Jiffy Prints, Flint
Job Shop, The
John Henry Company, The
JP Print & Copy
Keystone Printing, Inc.
Kimcraft Printers
Kinko's, Okemos
Kinko's Copies, Inc., Lansing
Kinko's, Inc., E. Lansing
Lake Superior Press
Lansing Printing Company
Lawson Printers, Inc.
Logan Brothers
LTI Printing
Macomb Printing
Malloy Inc.
Mason Graphics, Inc.
McGrath-DeFoe Printing
McKay Press
McNaughton & Gunn, Inc.
Michigan Education Data Network Association
MICR Graphics/Billy the Printer
Millbrook Printing
Mitchell Graphics
Myers Print King
North Star Print Group
Paper Image Printing Center
Parkman Printing, Inc.
Petoskey News-Review
PNK Printing
Portage Printing
Print Haus, The
Print Shop, The
Printery, The
Printwell
Progressive Graphics
Quick Printing Company
Relizon
Riegle Press Inc., The
Riverrun Press
Rogers Printing, Inc.
SBF/Corona Graphics, Inc.
Seeley's Printing Service
Sheridan Books, Inc., Ann Arbor
Sheridan Books, Inc., Chelsea
Sir Speedy
Sir Speedy Printing
Spartan Printing
Standard Printing & Office Supply
State of Michigan, Print & Graphic Services
Sterling Press
Superior Business Solutions
Superior Color Graphics
SVH Group
Target Information Management, Inc.
TBF Graphics
T.C. Advertising
Thomson-Shore Inc.
Townley Studio
Tweddle Litho Company
University Lithoprinters
Utley Brothers, Inc.
Valassis Communications, Inc.

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Webco Press - Mass Media
West Colony Printing
Wood Press Company

Michigan Pulp and Paper Pollution Prevention Program

Domtar Industries
International Paper Company
Louisiana-Pacific Corporation
Mead Westvaco Papers Group
Menasha Packaging Company
Menominee Paper Company
Packaging Corporation of America
RMT, Inc. (affiliate member)
Rock-Tenn Corporation
SAPPI Fine Paper, North America
Smurfit-Stone Container Corporation

Michigan Turfgrass Environmental Stewardship Program

A-Ga-Ming G.C.
Alpena Golf Club (Certified)
Ann Arbor C.C.
Apple Mountain Golf Club (Certified)
Arbor Hills C.C.
Arcadia Bluffs G.C.
Arcadia Hills G.C.
Battle Creek C.C.
Bay City C.C. (Certified)
Bay County G.C.
Beacon Hill G.C.
Bedford Valley G.C. (Certified)
Binder Park Golf Club
Birchwood Farm Golf and C.C.
Birmingham C.C. (Certified)
Black Lake Golf Club (Certified)
Bloomfield Hills C.C.
Blythfield C.C.
Bogie Lake Golf Club
Boyne Highlands Resort
Branson Bay
Briar Ridge G.C.
Bucks Run Golf Club
Byron Hills G.C.
Canadian Lakes C.C. (Certified)
Cascade Hills C.C.
Charlevoix C.C.
Charlevoix Golf Club
Cherry Creek Golf Club
Chestnut Valley Golf Club
Chisholm Hills Golf Club
Copper Hills Golf & C.C.
Copper Ridge G.C.
Country Club of Detroit
Country Club of Jackson
Crystal Mountain Resort
Crystal Springs C.C.
Currie Municipal G.C.
Dearborn Hills G.C. (Certified)
Deer Run G.C.
Eastern Hills G.C.
Egypt Valley C.C. (Certified)
Elk Ridge Golf Club
Ella Sharp Park G.C.
Elmbrook G.C.
Evergreen Hills G.C.
Fieldstone Golf Club
Flint Elks C.C.
Flint Golf Club
Forest Akers G.C. – M.S.U. (Certified)
Forest Lake C.C. (Certified)
Fox Creek G.C.
Fox Hills Golf and Banquet Center
Franklin Hills C.C. (Certified)
Garland Resort (Certified)
Gaylord C.C.
Germania Town & C.C.
Golf Club of Michigan
Goodrich C.C.
Gowanie Golf Club
Grand Haven Golf Club
Grand Hotel Golf Club
Grand Traverse Resort
Great Oaks C.C.
Greystone Golf Club

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Groesbeck G.C. (Certified)
Gull Lake C.C. (Certified)
Gull Lake View Golf Club (Certified)
Gull Lake View Stonehedge Golf Club (Certified)
Hawk Hollow G.C.
Heather Hills Golf Club
Heathers Club of Bloomfield Hills
Hemlock Golf Club
Hessel Ridge Golf
Hidden River Golf & C.C.
Hilltop Golf Club
Hudson Mills Metropark G.C. (Certified)
Huron Meadows Metropark G.C. (Certified)
Idyl Wyld G.C.
Indian Lake Hills G.C.
Indian Springs Metropark G.C. (Certified)
Indianwood Golf and C.C.
Inkster Valley Golf Club
IronWood Links
Kalamazoo C.C. (Certified)
Katke Cousins G.C.
Kensington Metropark G.C. (Certified)
Kincheloe Memorial G.C.
Knollwood C.C.
Lake Erie Metropark G.C. (Certified)
Lakeland Hills G.C.
Lakelands Golf and C.C.
Leelanau Club
Leslie Park G.C. (Certified)
Lincoln Hills Golf Club
Links at Bowen Lake
Links at Pinewood
Little Traverse Bay Golf Club
Lochenheath Golf Club
Lockmoor Club
Lost Lake Woods
Lower Huron Metropark G.C. (Certified)
Maple Hill Golf Club
Maple Lane Golf Club
Marion Oaks Golf Club
Marysville G.C. (Certified)
Marywood Golf Club
McGuires Resort
Meadowbrook C.C.
Metro Beach Metropark G.C. (Certified)
Midland C.C.
Milham Park Golf Club (Certified)
Moss Ridge G.C.
Mt. Pleasant C.C.
Mystic Creek Golf Club
Newberry C.C.
Northbrook G.C.
Northville Hills Golf Club
Oak Crest Golf Club
Oak Pointe C.C.
Oakhurst Golf & C.C.
Oakland County Parks – Glen Oaks (Certified)
Oakland County Parks – Lyons Oaks
Oakland County Parks – Springfield Oaks (Certified)
Oakland County Parks – White Lake Oaks (Certified)
Oakland Hills C.C.
Paint Creek C.C. (Certified)
Partridge Creek G.C.
Petoskey-Bay View C.C.
Pheasant Run Golf Club
Pictured Rock Golf and C.C.
Pierce Lake G.C.
Pine Lake C.C.
Pine View Golf Club
Pipestone Creek
Plym Park Golf Club
Point O'Woods Golf & C.C.
Port Huron Golf Club
Radrick Farms Golf Club
Railside Golf Club (Certified)
Raisin River Golf Club
Ramshorn C.C.
Red Arrow
Red Hawk Golf Club
Red Run Golf Club
Richmond Forest G.C.

Pollution Prevention

Riverview Highlands Golf Club
Rolling Meadows G.C.
Royal Scot Golf (Certified)
Saginaw C.C.
Salem Hills G.C.
Shanty Creek Resort
Shepherd's Hollow Golf Club
Somerset Park Golf Club
Southgate Municipal G.C. (Certified)
Southmoor G.C.
Spring Lake C.C.
St. Clair River C.C.
St. Clair Shores C.C. (Certified)
St. Ives Golf Club
St. Johns Golf Center
Stonebridge Golf Club
Stony Creek Golf Club
Sunnybrook C.C.
Sycamore Hills Golf Club
Sylvan Glen G.C.
Tam O'Shanter C.C.
Tanglewood Marsh Golf Club
Tecumseh C.C.
Terrace Bluff C.C.
The Emerald at Maple Creek
The Farm Golf Club
The Fortress
The Highlands
The Kingsley Club
The Legacy G.C.
The Links at Whitmore Lake
The Majestic At Lake Walden
The Meadows Golf Club
The Moors Golf Club
The Natural
The Orchards Golf Club
The Otsego Club
The Pines at Lake Isabella
The Pohlcat
The Rock (Certified)
The Sawmill Golf Club
The Timbers Golf Club
The Wyndgate
Thousand Oaks Golf Club
Thunder Bay Resort
Timber Ridge Golf Club (Certified)
Tournament Players Club of Michigan
Traverse City Golf & C.C. (Certified)
Travis Pointe C.C.
Treetops Sylvan Resort
Twin Beach C.C.
Twin Lakes Golf Club
Ubly Heights Golf & C.C.
University of Michigan G.C.
Veronica Valley G.C.
Wabeek C.C.
Walloon Lake C.C.
Walnut Creek C.C.
Walnut Hills C.C. (Certified)
Warren Valley G.C.
Warwick Hills Golf and C.C. (Certified)
Washtenaw C.C.
Watermark C.C.
Whispering Pines Golf Club
Whispering Willows G.C. (Certified)
Wild Bluff Golf Course
Willow Metropark G.C. (Certified)
Wolverine Golf Club (Certified)
Woodlands of VanBuren
Wuskowhan Players Club (Certified)
Wyandotte Shores G.C.

Small Business Chemical Manufacturers' Pollution Prevention Initiative

Access Business Group
American Institute of Chemical Engineers (Mid-Michigan section)
Anderson Development Co.
Atofina Chemicals, Inc.
Bayer CropScience
Dow Chemical Co.
Dow Corning Corp.
DuPont Automotive
ESCO Co.
Hemlock Semiconductor Corp.
Hercules Inc.

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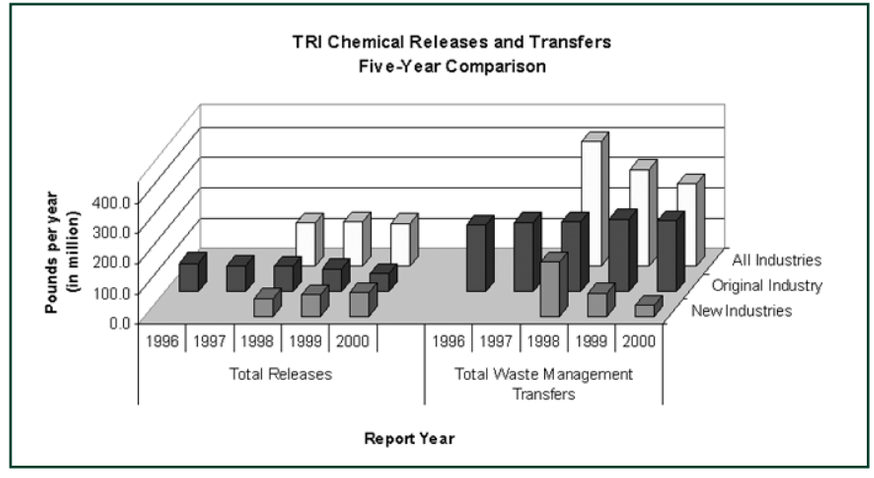
Michigan Chemistry Council
Michigan Industries of the Future
Nelson Technologies, Inc.
Oleson Consulting, Inc.
Ondeo-Nalco Chemical Co.
Pfizer Global Manufacturing
Pharmacia & Upjohn, Inc.
RETAP
Solutia, Inc.
Wacker Silicones Corp.
Wayne State University

APPENDIX C: Toxic Release Inventory Chemical Data

The Toxic Release Inventory (TRI) chemical data presented in this report is a statewide total of the toxic release data for 1996 through 2000 and does not indicate upward or downward trends for individual pollutants or facilities. Additional information on individual pollutants and facilities, including historical information, is available on the internet at **www.deq.state.mi.us/tri/**.

Results for 2000, the most recent reporting year, show that chemical releases decreased from 1999. Facilities reported total on-site and off-site releases of 141 million pounds in 2000, compared to 146 million pounds in 1999. Prior to 1998, the TRI covered 20 manufacturing categories. In 1998, seven non-manufacturing industrial sectors (new sectors) began reporting their toxic chemical releases. Graph 1 shows the impact of these new reporting sectors on TRI.



Graph 1
Source: MDEQ SARA Title III data – January 31, 2002
NOTE: Report Year 1998, 1999, and 2000 totals break out Original from New Industries

Over the past few years, the Department of Environmental Quality has reviewed the TRI waste management data to determine whether the information can be used as an indicator of the progress of pollution prevention in the state. The review has focused on reductions in the amounts of TRI chemicals released annually, changes in recycling and energy recovery rates, and fluctuations in production information. Results are difficult to assess due to the difficulty of extracting the impacts of the economy and changes in environmental legislation on TRI.

The following three graphs depict changes in Michigan's TRI data over time. Graph 2 shows the total quantity

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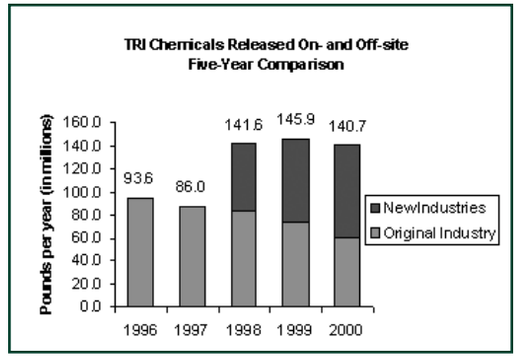
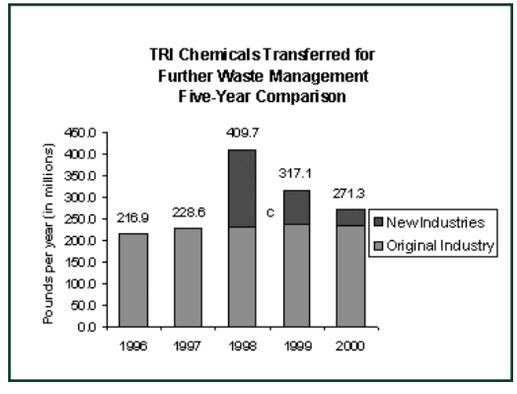
of TRI chemicals released to the environment over five years. Graph 3 shows the total quantity of TRI chemicals transferred off-site for further waste management (recycling, energy recovery, and treatment). Graph 4 shows the total amount of production-related waste managed by Michigan facilities through recycling, energy recovery, treatment, and disposal activities, both on-site and off-site.

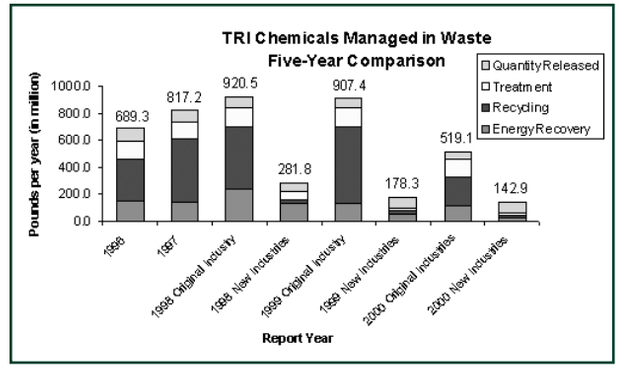
The Department of Environmental Quality is currently assessing TRI data for reporting year 2001. This information will be available from the department in January 2003. For additional information, contact the department SARA Title III Program office.



Graph 2
Source: MDEQ SARA Title III data – January 31, 2002
NOTE: Report Year 1998, 1999, and 2000 totals break out Original from New Industries



Graph 3
Source: MDEQ SARA Title III data – January 31, 2002
Note: Report Year 1998, 1999, and 2000 totals break out Original from New Industries



Graph 4
Source: MDEQ SARA Title III data – January 31, 2002
NOTE: Report Year 1998, 1999, and 2000 totals break out Original from New Industries

Pollution Prevention

You Can Drive Change . . .

Pollution prevention is the combination of activities that reduce or eliminate waste at the source of production or prevents waste from entering the environment or waste stream. Pollution prevention occurs when raw materials, energy, water, and other resources are used more efficiently; when less harmful substances are substituted for hazardous ones; and when toxic substances are eliminated from the production process. Source reduction is the preferred method of pollution prevention and allows for the most significant improvements in environmental protection by avoiding the generation of waste. Reuse/recycling and energy recovery also are effective means of pollution prevention. By reducing the use and production of hazardous substances, and by operating more efficiently, we protect human health, preserve the environment, and strengthen our economic well-being.

The health and environmental benefits of implementing pollution prevention practices include cleaner air and water, fewer greenhouse gas emissions, less solid waste going to landfills, less toxic waste to manage, greater work place safety, and better stewardship of natural resources. These practices will, in turn, lead to a reduction in work place exposures to hazardous materials, which can affect workers' health and productivity.

The economic benefits of pollution prevention include greater business efficiency, increased competitiveness, and reduced costs for regulatory monitoring and compliance. By preventing the generation of waste, pollution prevention can also reduce or eliminate long-term liabilities, clean-up, storage, and disposal costs. Finally, by preventing pollution there is a greater likelihood that a company will be in compliance with local, state, and federal statutes.

Plan for the future, design and implement a pollution prevention program at your facility — while there is no one plan that fits all, the steps to implementation are universal.

Driving Change

. . . Pollution Prevention Starts Today!

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